In the Claims

1.(currently amended) A composition comprising:

a nano-particle core comprising a first conductive material comprising a metal, a metal alloy, a conductive polymer, or any combination thereof, and

a nano-structure formed on an outer surface of the core, where the nano-structure comprises a second conductive material comprising a metal, a metal alloy, or any combination thereof,

where the first and second conductive materials are the same or different. ~~a nano-particle core and a nano-structure formed on an outer surface of the core, where the nano-particle core comprises a first conductive material and the nano-structure comprises a second conductive material, where the first and second conductive materials are the same or different.~~

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49.(new) The composition of 1, wherein the nano-structure comprises a nano-shell, a plurality of nano-rods, or a nano-shell having a plurality of nano-rods disposed on a surface of the nano-shell.

50.(new) The composition of 1, wherein the metals and metal alloys are selected from the group consisting of non-transition metals, non-transition metal alloys, transition metals, transition metal alloys, lanthanide metals, lanthanide metal alloys, actinide metals, actinide metal alloys and any combination thereof.

51.(new) The composition of claim 1, wherein the metal and metal alloys are noble metals or noble metal alloys, where the noble metals are selected from the group consisting of gold, silver, platinum, palladium, iridium, osmium, ruthenium, rhodium, and any combination thereof.

52.(new) The composition of claim 1, wherein the nano-structure has a plasmon resonance.

53.(new) The composition of claim 52, wherein the plasmon resonance has a frequency range at least a portion of which lies in the near infrared region of the electromagnetic spectrum.

54.(new) A composition comprising:

a nano-particle core comprising a first conductive material selected from the group consisting of a metal, a metal alloy, and any combination thereof, and

a nano-structure formed on an outer surface of the core, where the nano-structure comprises a second conductive material selected from the group consisting of a metal, a metal alloy, and any combination thereof,

where the first and second conductive materials are the same or different.

55.(new) The composition of 54, wherein the nano-structure comprises a nano-shell, a plurality of nano-rods, or a nano-shell having a plurality of nano-rods disposed on a surface of the nano-shell.

56.(new) The composition of claim 54, wherein the metals and metal alloys are selected from the group consisting of non-transition metals, non-transition metal alloys, transition metals, transition metal alloys, lanthanide metals, lanthanide metal alloys, actinide metals, actinide metal alloys and any combination thereof.

57.(new) The composition of claim 54, wherein the metal and metal alloys are noble metals or noble metal alloys, where the noble metals are selected from the group consisting of gold, silver, platinum, palladium, iridium, osmium, ruthenium, rhodium, and any combination thereof.

58.(new) The composition of claim 54, wherein the nano-structure has a plasmon resonance having a frequency range at least a portion of which lies in the near infrared region of the electromagnetic spectrum.

59.(new) A composition comprising:

a nano-particle core comprising a first conductive material comprising a metal, a metal alloy, a conductive polymer, or any combination thereof, and

a nano-structure formed on an outer surface of the core,

where the nano-structure is selected from the group consisting of a nano-shell, a plurality of nano-rods, and a nano-shell having a plurality of nano-rods disposed on a surface of the nano-shell,

where the nano-structure comprises a second conductive material comprising a metal, a metal

alloy, or any combination thereof,

where the nano-rods comprise a third conductive material comprises a metal, a metal alloy, or any combination thereof, and

where the first, second and third conductive materials are the same or different.

60.(new) The composition of claim 59, wherein the metals and metal alloys are selected from the group consisting of non-transition metals, non-transition metal alloys, transition metals, transition metal alloys, lanthanide metals, lanthanide metal alloys, actinide metals, actinide metal alloys and any combination thereof.

61.(new) The composition of claim 59, wherein the metal and metal alloys are noble metals or noble metal alloys, where the noble metals are selected from the group consisting of gold, silver, platinum, palladium, iridium, osmium, ruthenium, rhodium, and mixtures or combinations thereof.

62.(new) The composition of claim 59, wherein the nano-structure has a plasmon resonance.

63.(new) The composition of claim 62, wherein the plasmon resonance has a frequency range at least a portion of which lies in the near infrared region of the electromagnetic spectrum.

64.(new) A composition comprising:

a nano-particle core comprising a first conductive material selected from the group consisting of a metal, a metal alloy, and any combination thereof, and

a nano-structure formed on an outer surface of the core,

where the nano-structure is selected from the group consisting of a nano-shell, a plurality of nano-rods, and a nano-shell having a plurality of nano-rods disposed on a surface of the nano-shell,

where the nano-structure comprises a second conductive material selected from the group consisting of a metal, a metal alloy, and any combination thereof,

where the nano-rods comprise a third conductive material selected from the group consisting a metal, a metal alloy, and any combination thereof, and

where the first, second and third conductive materials are the same or different.

65.(new) The composition of claim 64, wherein the metals and metal alloys are selected from the group consisting of non-transition metals, non-transition metal alloys, transition metals, transition metal alloys, lanthanide metals, lanthanide metal alloys, actinide metals, actinide metal alloys and any combination thereof.

66.(new) The composition of claim 64, wherein the metal and metal alloys are noble metals or noble metal alloys, where the noble metals are selected from the group consisting of gold, silver, platinum, palladium, iridium, osmium, ruthenium, rhodium, and any combination thereof.

67.(new) The composition of claim 64, wherein the nano-structure has a plasmon resonance having a frequency range at least a portion of which lies in the near infrared region of the electromagnetic spectrum.